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Electronic Supporting Information

Colloidal Synthesis of 1-D van der Waals material Nb_2Se_9: Study of Synergism of Coordinating agent in Co-solvent system

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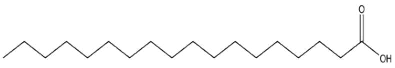
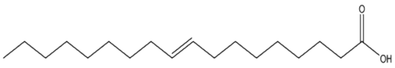
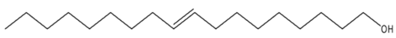
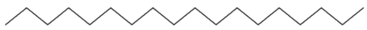
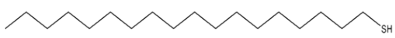
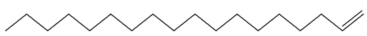
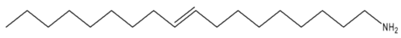
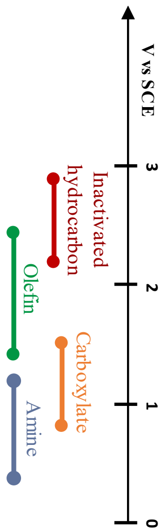
Supplementary Figures

Table S1. Molecular structure, functional group and, redox potential of 7 selected solvents.

Solvent	Molecular structure	Functional group	Redox potential
Octadecanoic acid (ODAc)		COOH	ODAc
Oleic acid (OLAc)		COOH	OLAc
Oleylalcohol (OLAl)		OH	OLAl
Octadecane (ODC)		alkane	ODC
Octadecanethiol (ODT)		SH	ODT
Octadecene (ODE)		alkene	ODE
Oleylamine (OLA)		NH_2	OLA



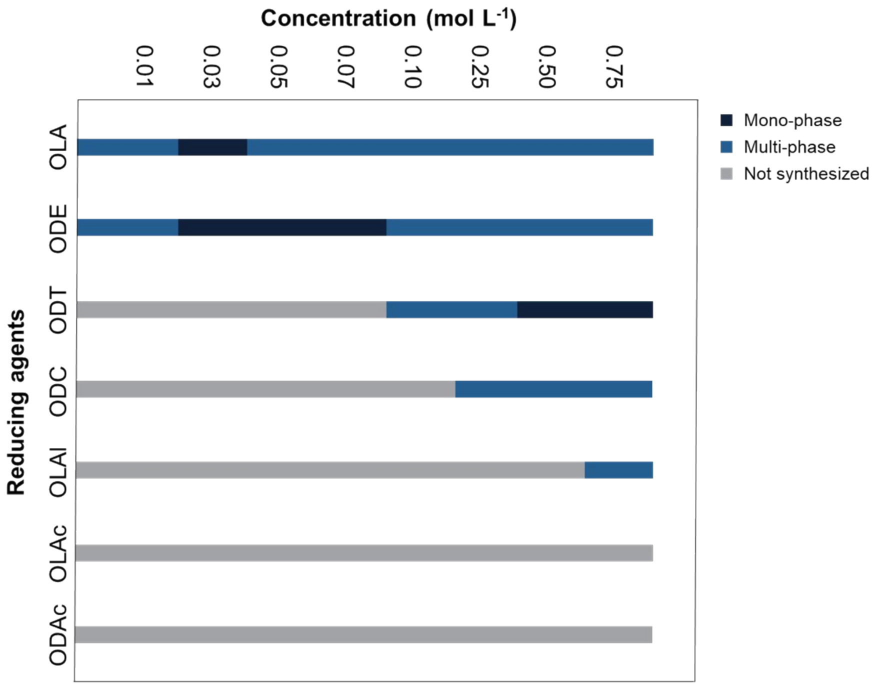


Fig. S1. Bar graph of Nb_2Se_9 synthesis condition as a function of precursor concentration and reducing power.

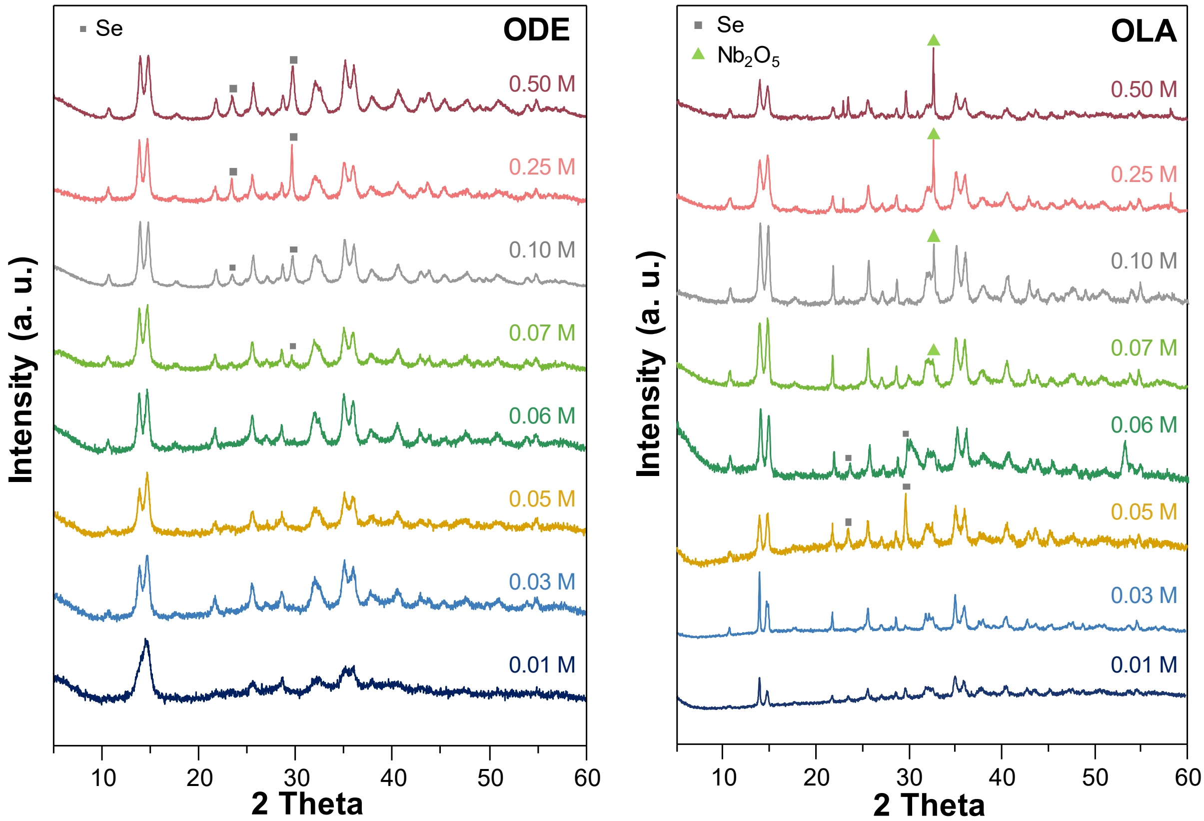


Fig. S2. XRD patterns of Nb_2Se_9 synthesised from ODE (left) and OLA (right) conditions in a concentration range of 0.01–0.50 M.

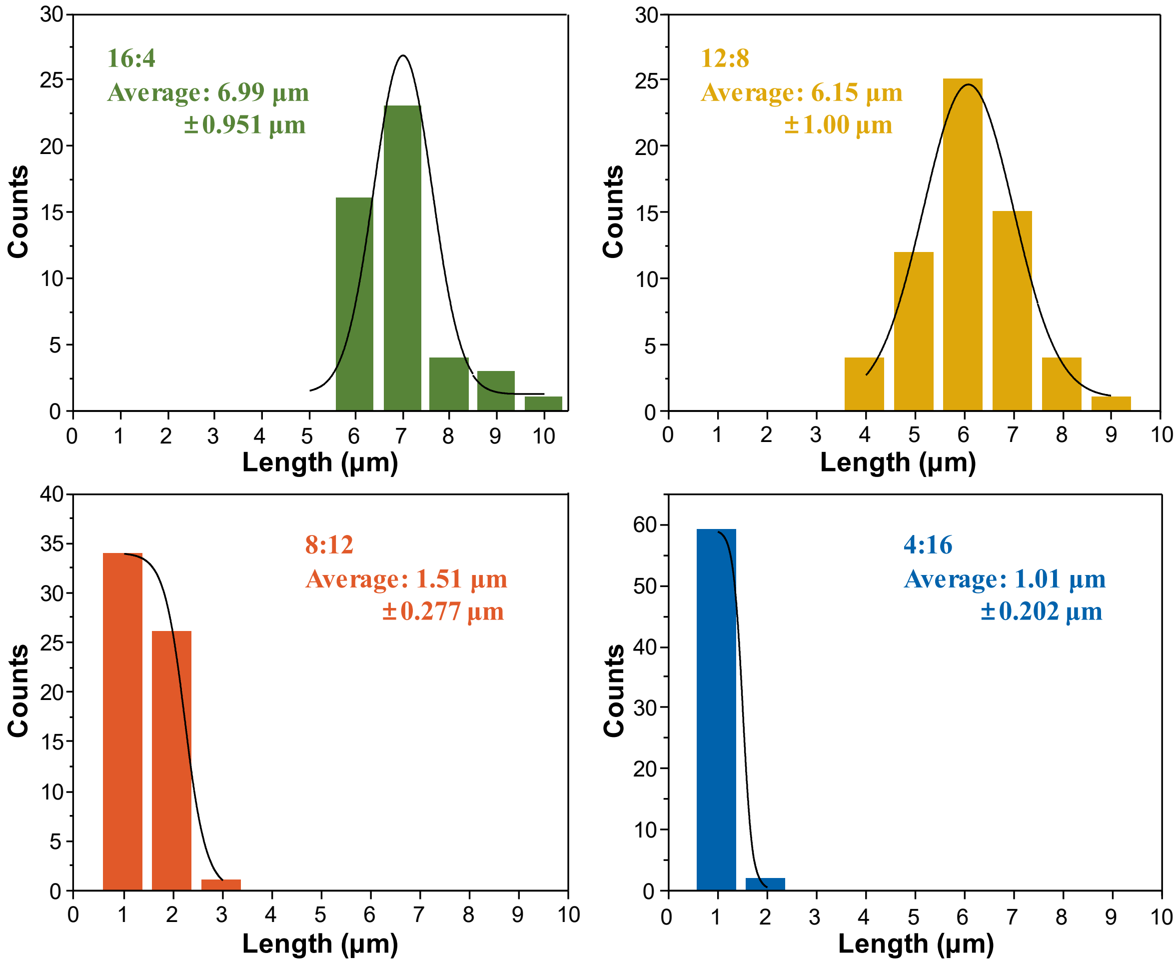


Fig. S3. Nb_2Se_9 length histogram at various solvent ratio conditions of ODE/OLA system.

Table S2. XRD intensity ratio and FWHM of Nb_2Se_9 synthesised from ODE/OLA system.

ODE:OLA	Morphology	Intensity ratio (010) / (100)	FWHM (010)	FWHM (100)
20:0	Rod	0.921	0.427	0.483
16:4	Wire	1.432	0.210	0.394
12:8	Wire	2.042	0.150	0.366
8:12	Sheet-like	2.752	0.114	0.165
4:16	Sheet-like	2.858	0.106	1.847
0:20	Sheet	2.071	0.131	0.328

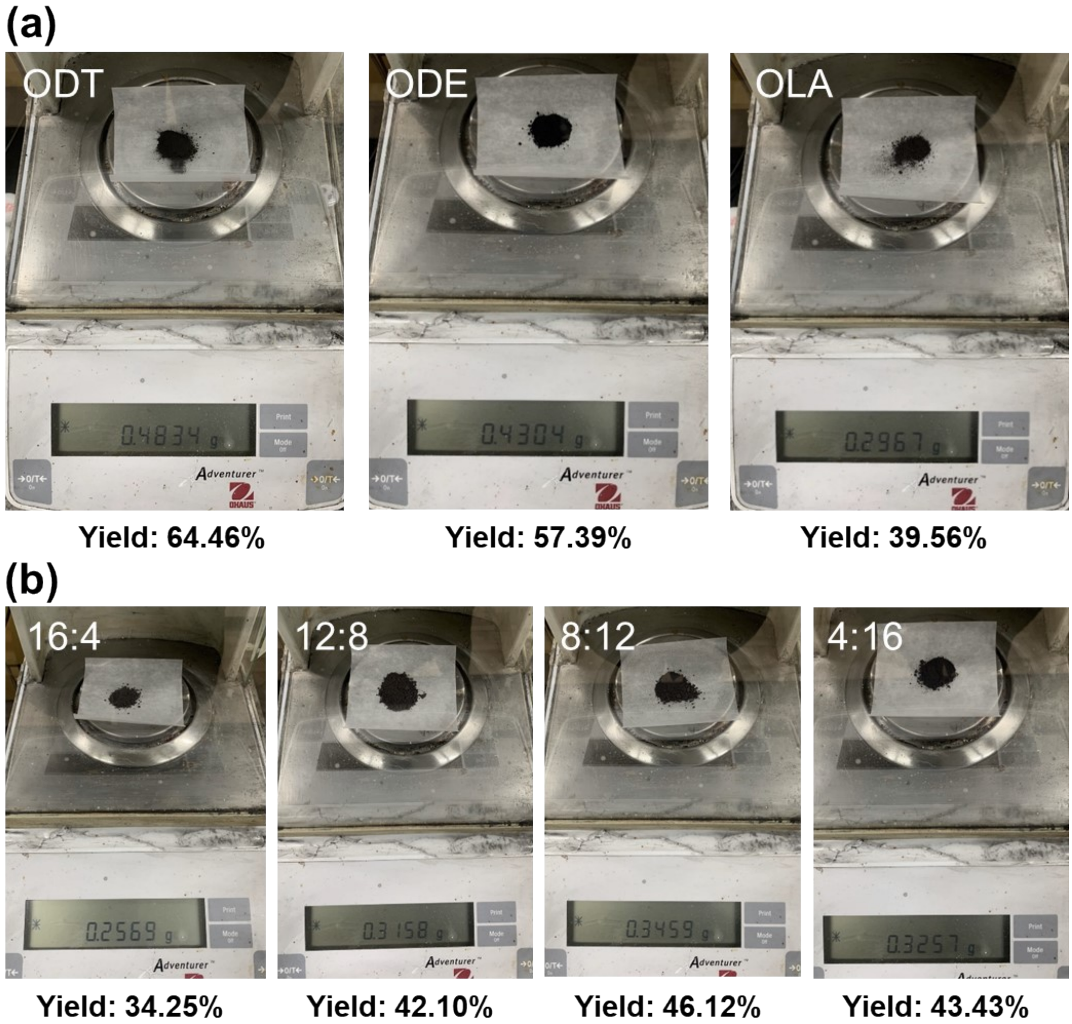


Fig. S4. Yield of as-synthesized Nb_2Se_9 from (a) single-solvent and (b) ODE/OLA system.

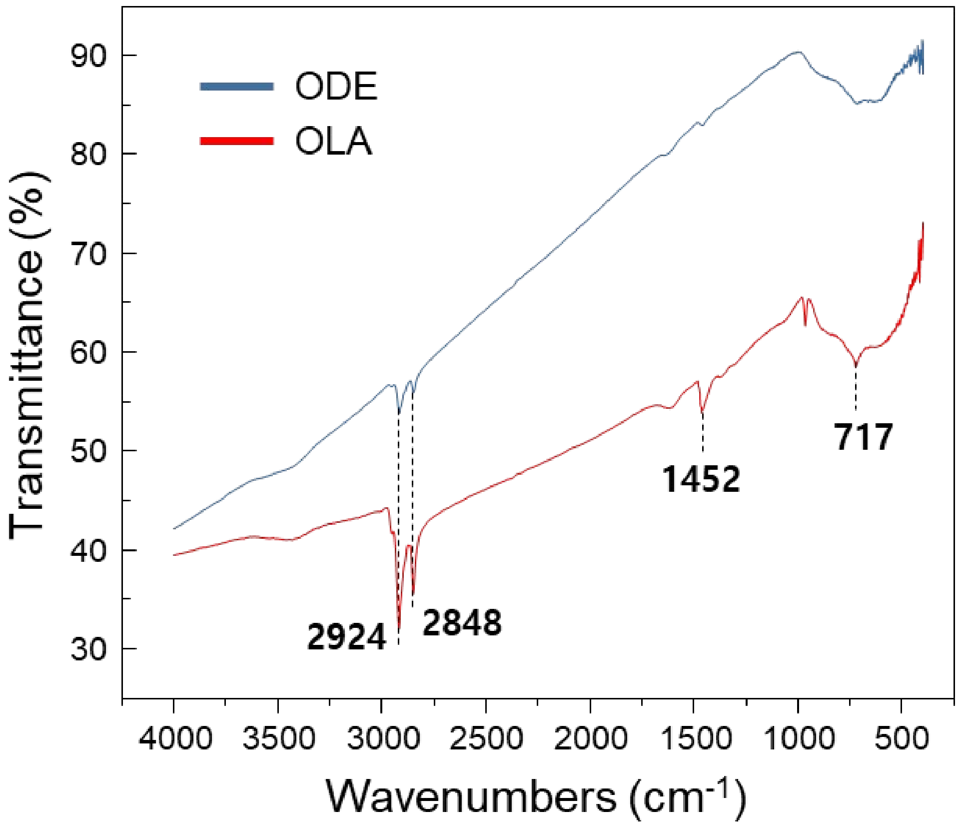


Fig. S5. FT-IR spectrum of Nb_2Se_9 derived from single-solvent syntheses.

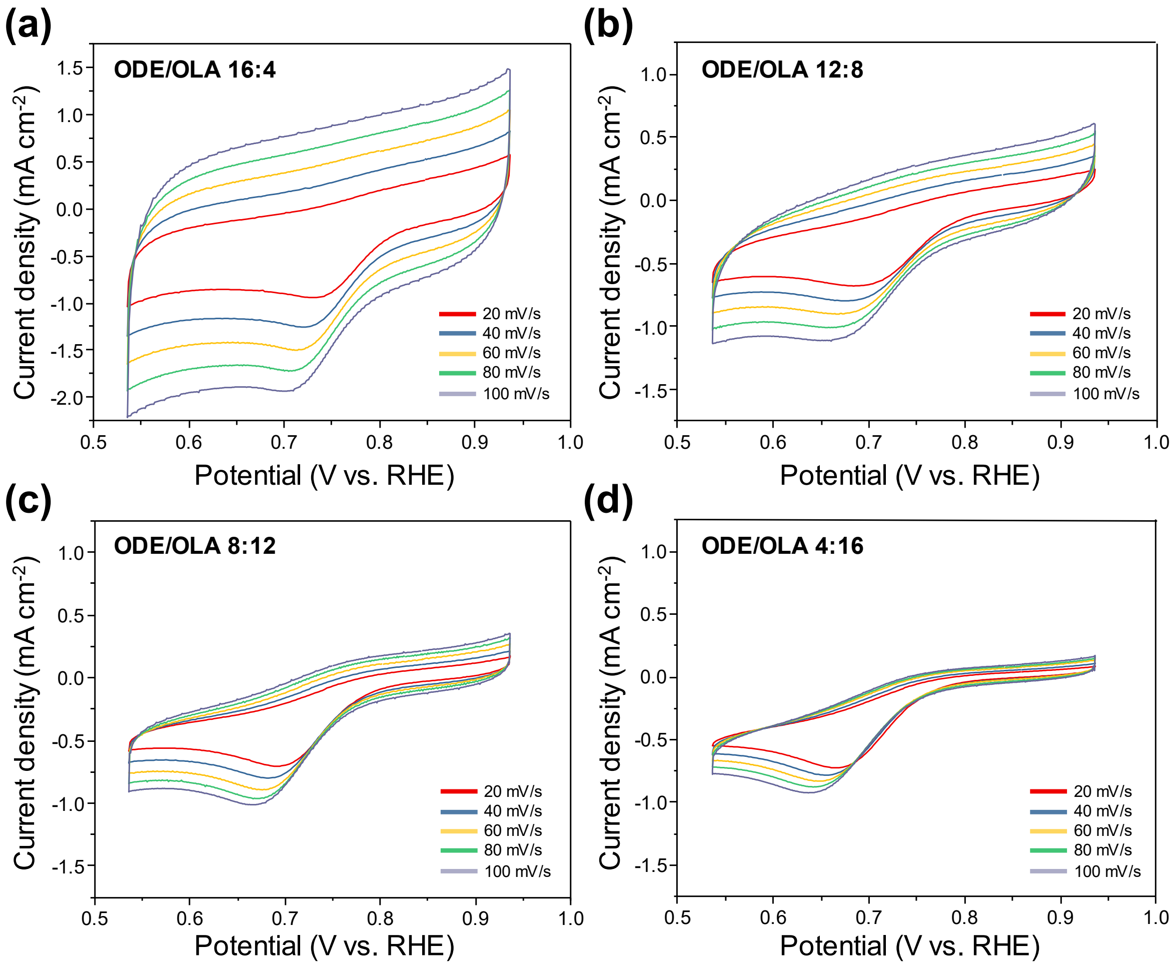


Fig. S6. Cyclic voltammetry plot of morphology-controlled Nb_2Se_9 with ODE/OLA ratio of 16:4, 12:8, 8:12, and 4:16.

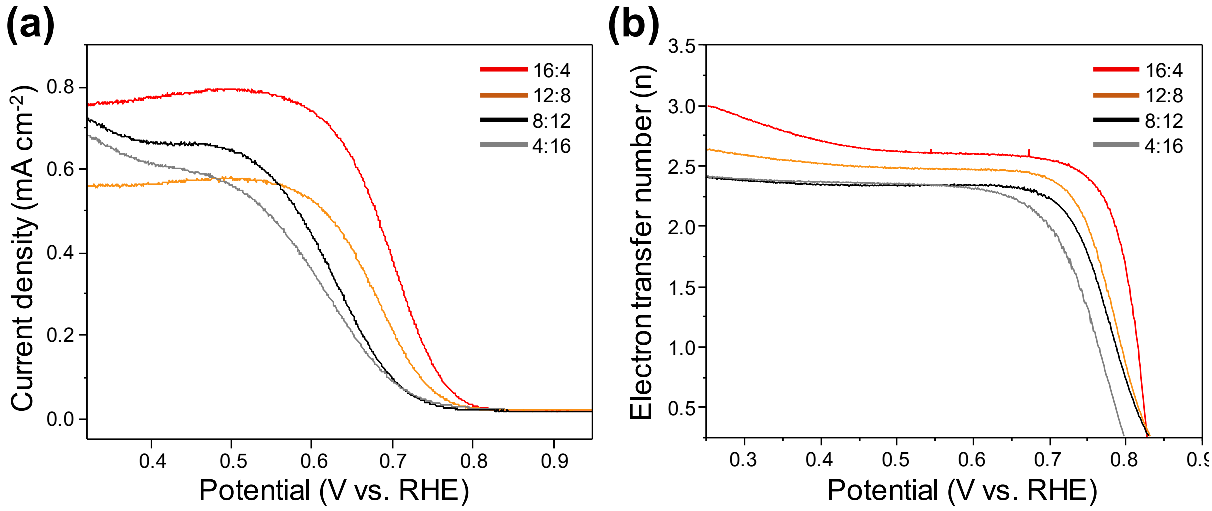


Fig. S7. (a) Ring current and (b) electron transfer number of morphology-controlled Nb_2Se_9 from ODE/OLA ratio of 16:4, 12:8, 8:12, and 4:16.

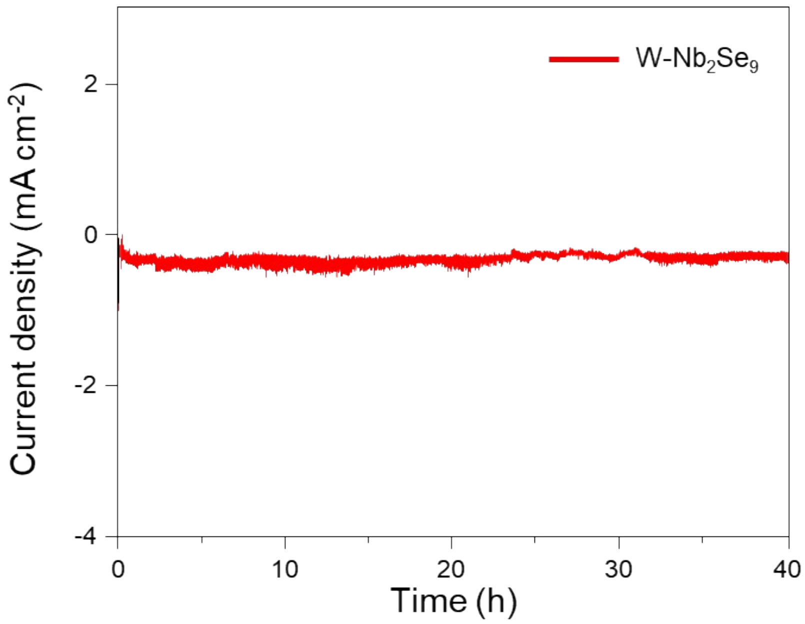


Fig. S8. Chronoamperometry stability test of W-Nb_2Se_9 from 16:4 condition.

Table S3. ORR performance of catalysts obtained from RDE.

Metal	Configuration	E_{onset} vs. RHE	Tafel slope	Reference
Pt	Pt (20 wt%)/C	1.07 V in 0.1 M KOH	57 mV dec^{-1}	1
Ag	Ag (110)	0.91 V in 0.1 M KOH	80 mV dec^{-1}	2
Au	Au (111)	0.84 V in 0.1 M KOH		3
Mo	MoS	0.78 V in 0.1 M KOH,	54.7 mV dec^{-1}	4
Nb	W-Nb_2Se_9	0.84 V in 0.1 M KOH	69.4 mV dec^{-1}	This work

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